FIG. 1

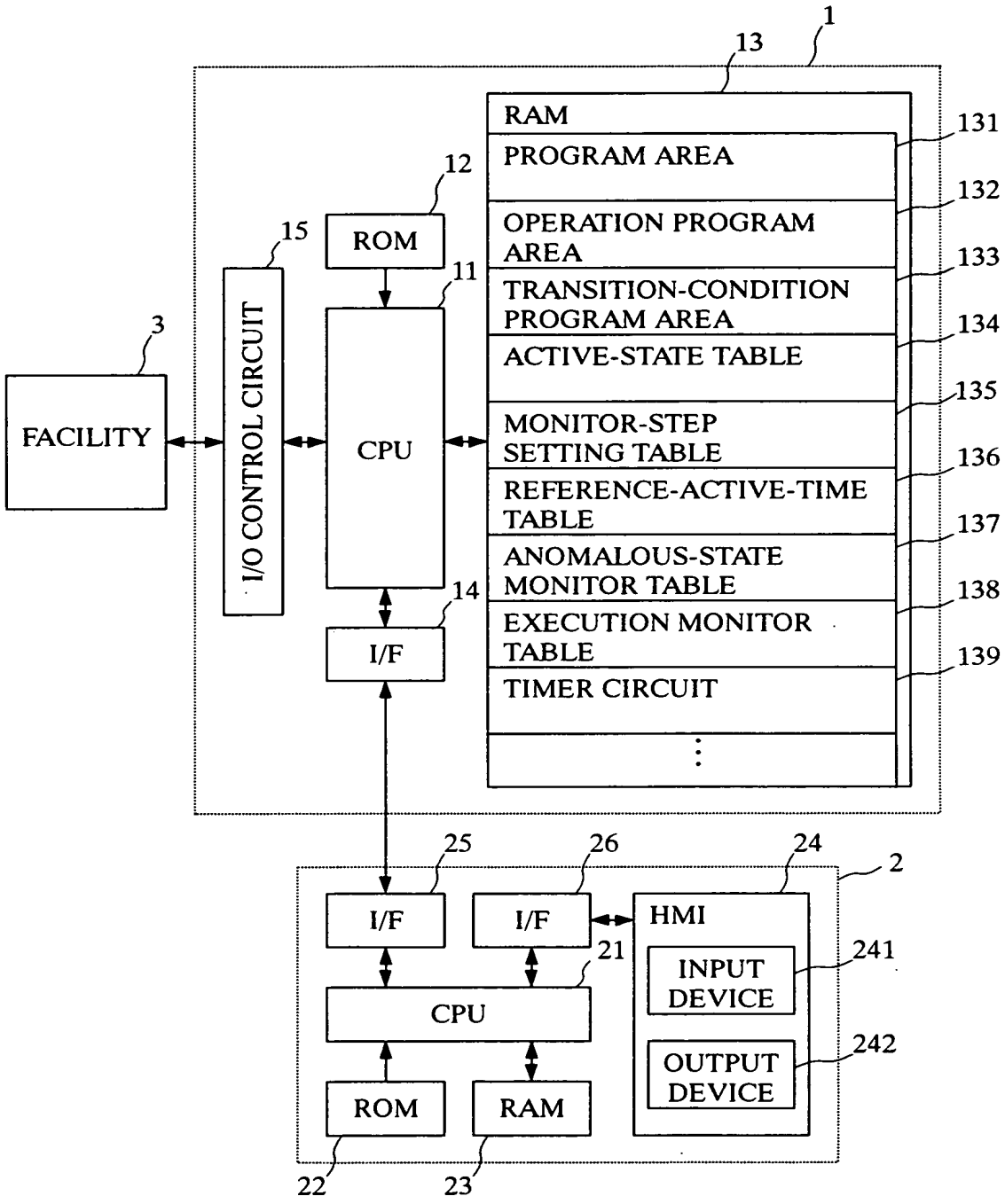

1
13
RAM
131
PROGRAM AREA
132
OPERATION PROGRAM AREA
133
TRANSITION-CONDITION PROGRAM AREA
134
ACTIVE-STATE TABLE
135
MONITOR-STEP SETTING TABLE
136
REFERENCE-ACTIVE-TIME TABLE
137
ANOMALOUS-STATE MONITOR TABLE
138
EXECUTION MONITOR TABLE
139
TIMER CIRCUIT
12
ROM
15
I/O CONTROL CIRCUIT
11
CPU
3
FACILITY
14
I/F
25
26
24
2
I/F
I/F
HMI
21
241
INPUT DEVICE
CPU
242
OUTPUT DEVICE
ROM
RAM
22
23

FIG. 2

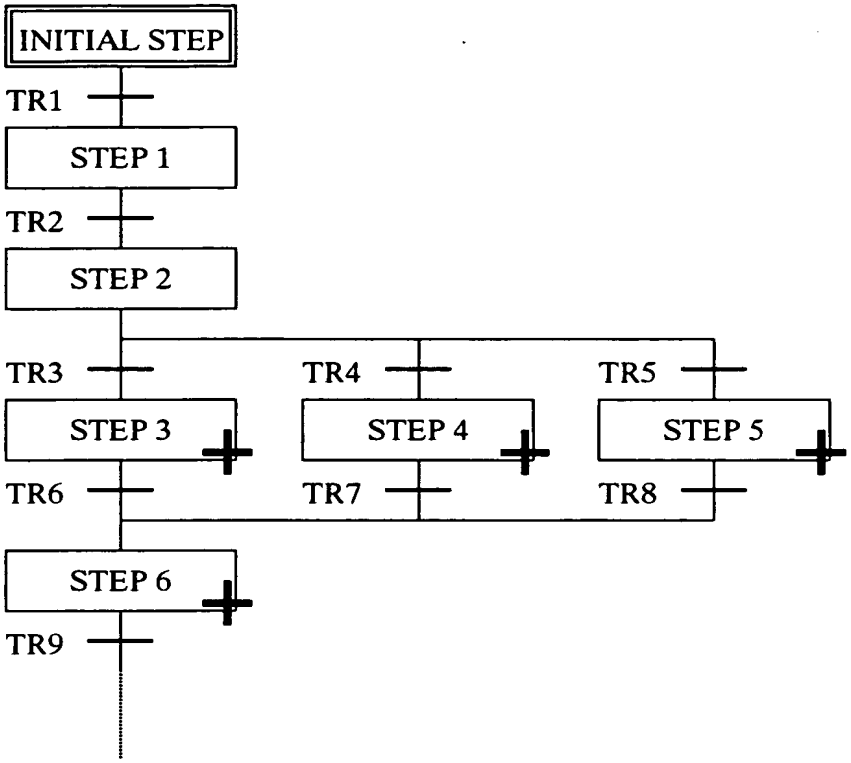


FIG. 3

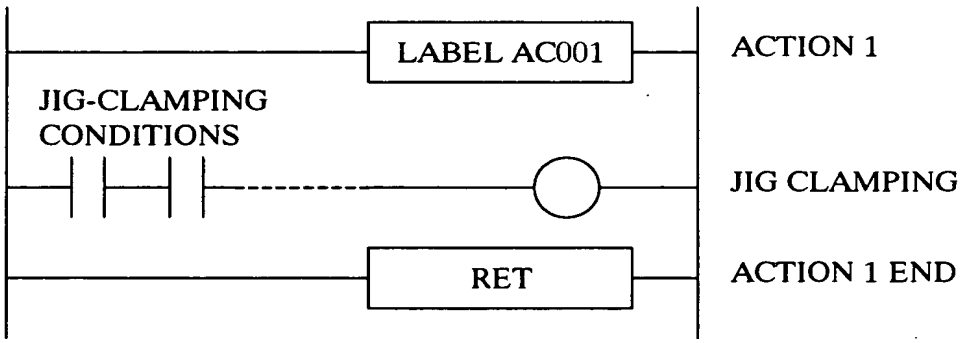


FIG. 4

FIG. 5

134

STEP	ACTIVE FLAG
INITIAL STEP	0
STEP 1	0
STEP 2	0
STEP 3	0
STEP 4	0
STEP 5	0
STEP 6	1
⋮	

FIG. 6

135

STEP	MONITOR FLAG
INITIAL STEP	0
STEP 1	0
STEP 2	0
STEP 3	1
STEP 4	1
STEP 5	1
STEP 6	1
⋮	

FIG. 7

136

STEP	REFERENCE ACTIVE TIME
INITIAL STEP	
STEP 1	
STEP 2	
STEP 3	10.0
STEP 4	10.0
STEP 5	10.0
STEP 6	5.0
⋮	

FIG. 8

137

STEP	ANOMALOUS-STATE FLAG
INITIAL STEP	0
STEP 1	0
STEP 2	0
STEP 3	0
STEP 4	0
STEP 5	0
STEP 6	1
. . .	

FIG. 9

138

STEP	EXECUTION-COMPLETION FLAG
INITIAL STEP	1
STEP 1	1
STEP 2	1
STEP 3	0
STEP 4	1
STEP 5	0
STEP 6	0
. . .	

FIG. 10

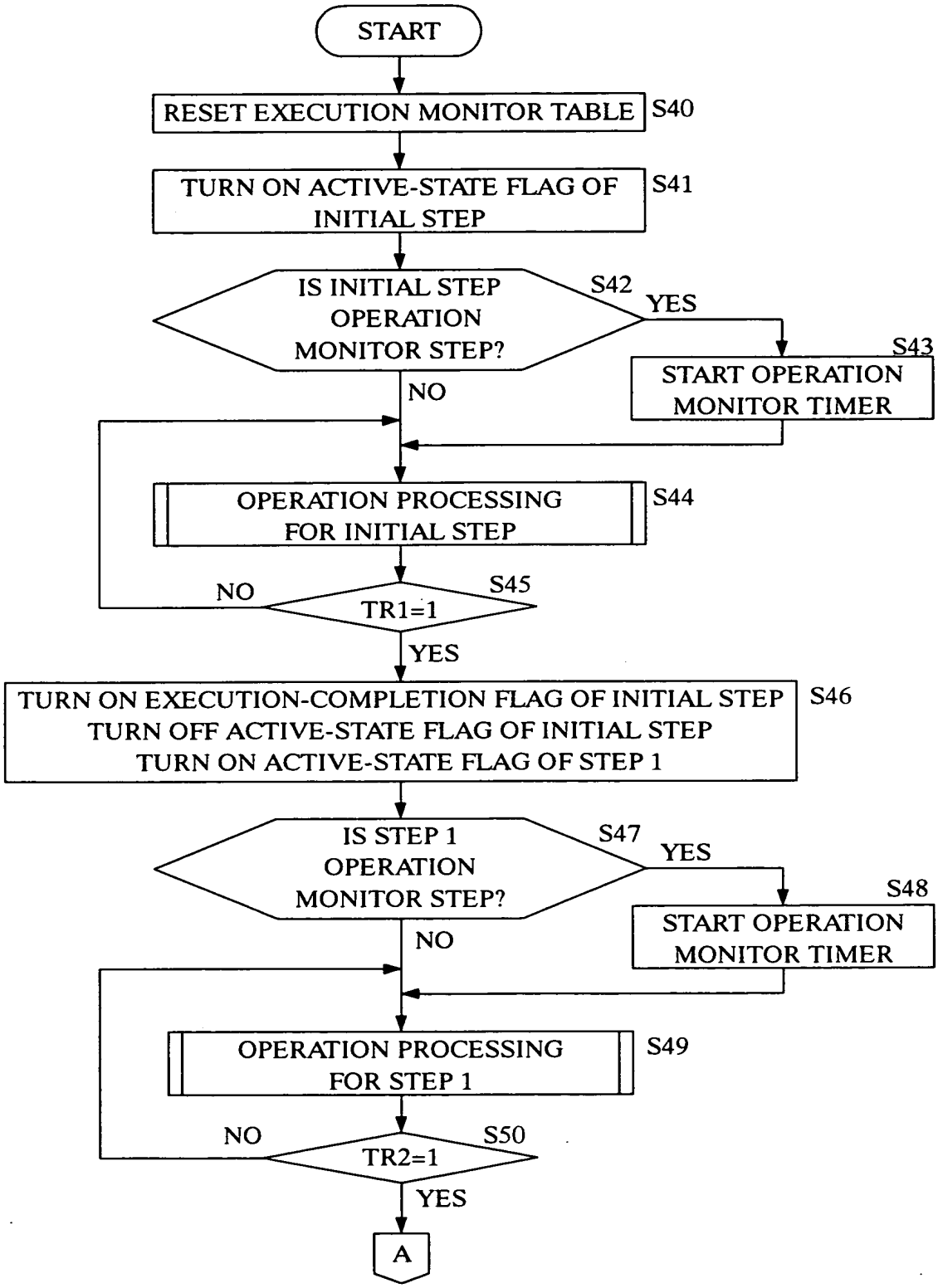

START
RESET EXECUTION MONITOR TABLE
S40
TURN ON ACTIVE-STATE FLAG OF INITIAL STEP
S41
IS INITIAL STEP OPERATION MONITOR STEP?
S42
YES
NO
START OPERATION MONITOR TIMER
S43
OPERATION PROCESSING FOR INITIAL STEP
S44
NO
TR1=1
S45
YES
TURN ON EXECUTION-COMPLETION FLAG OF INITIAL STEP
TURN OFF ACTIVE-STATE FLAG OF INITIAL STEP
TURN ON ACTIVE-STATE FLAG OF STEP 1
S46
IS STEP 1 OPERATION MONITOR STEP?
S47
YES
NO
START OPERATION MONITOR TIMER
S48
OPERATION PROCESSING FOR STEP 1
S49
NO
TR2=1
S50
YES
A

FIG. 11

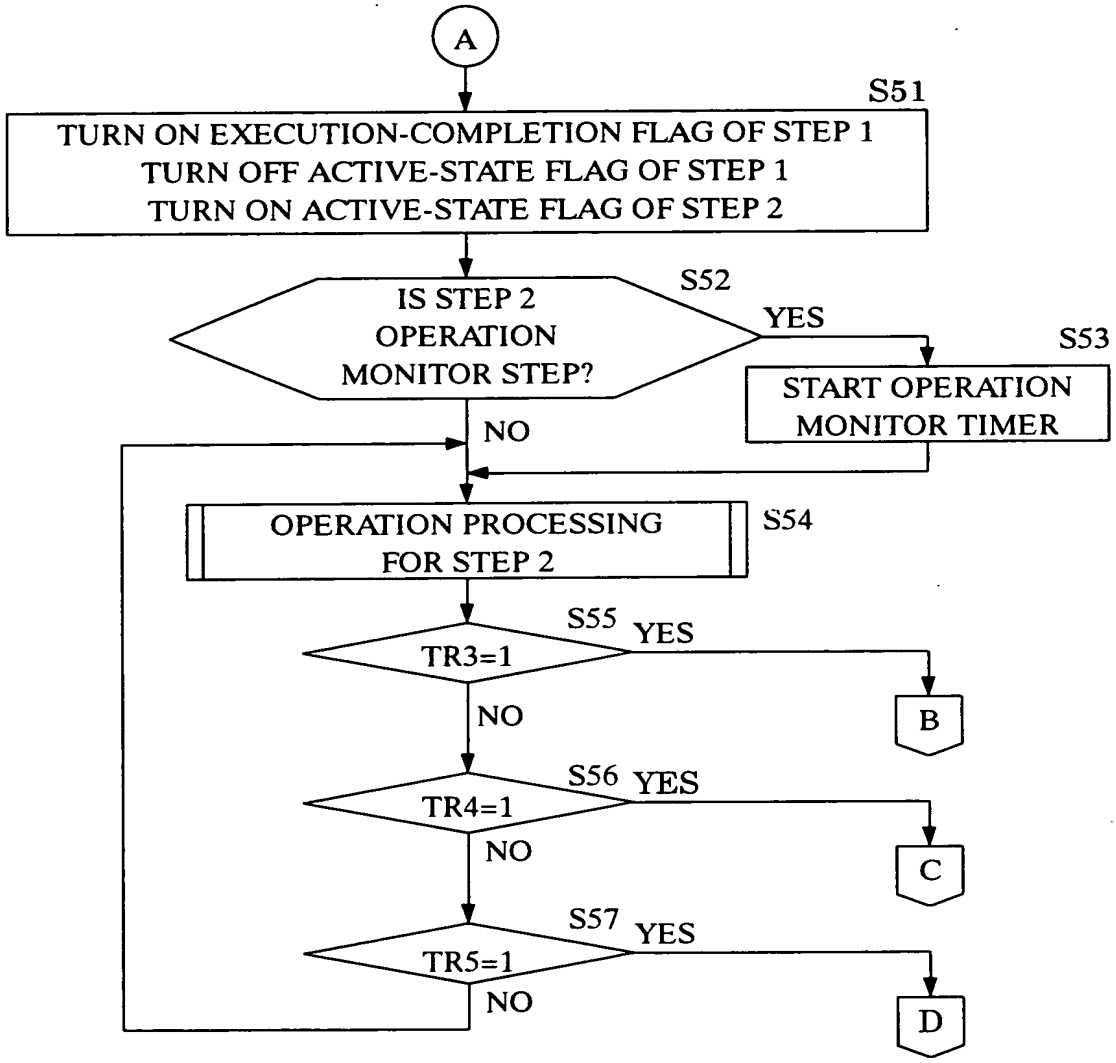

A
S51
TURN ON EXECUTION-COMPLETION FLAG OF STEP 1
TURN OFF ACTIVE-STATE FLAG OF STEP 1
TURN ON ACTIVE-STATE FLAG OF STEP 2
S52
IS STEP 2 OPERATION MONITOR STEP?
YES
S53
START OPERATION MONITOR TIMER
NO
OPERATION PROCESSING FOR STEP 2
S54
S55
TR3=1
YES
B
NO
S56
TR4=1
YES
C
NO
S57
TR5=1
YES
D
NO

FIG. 12

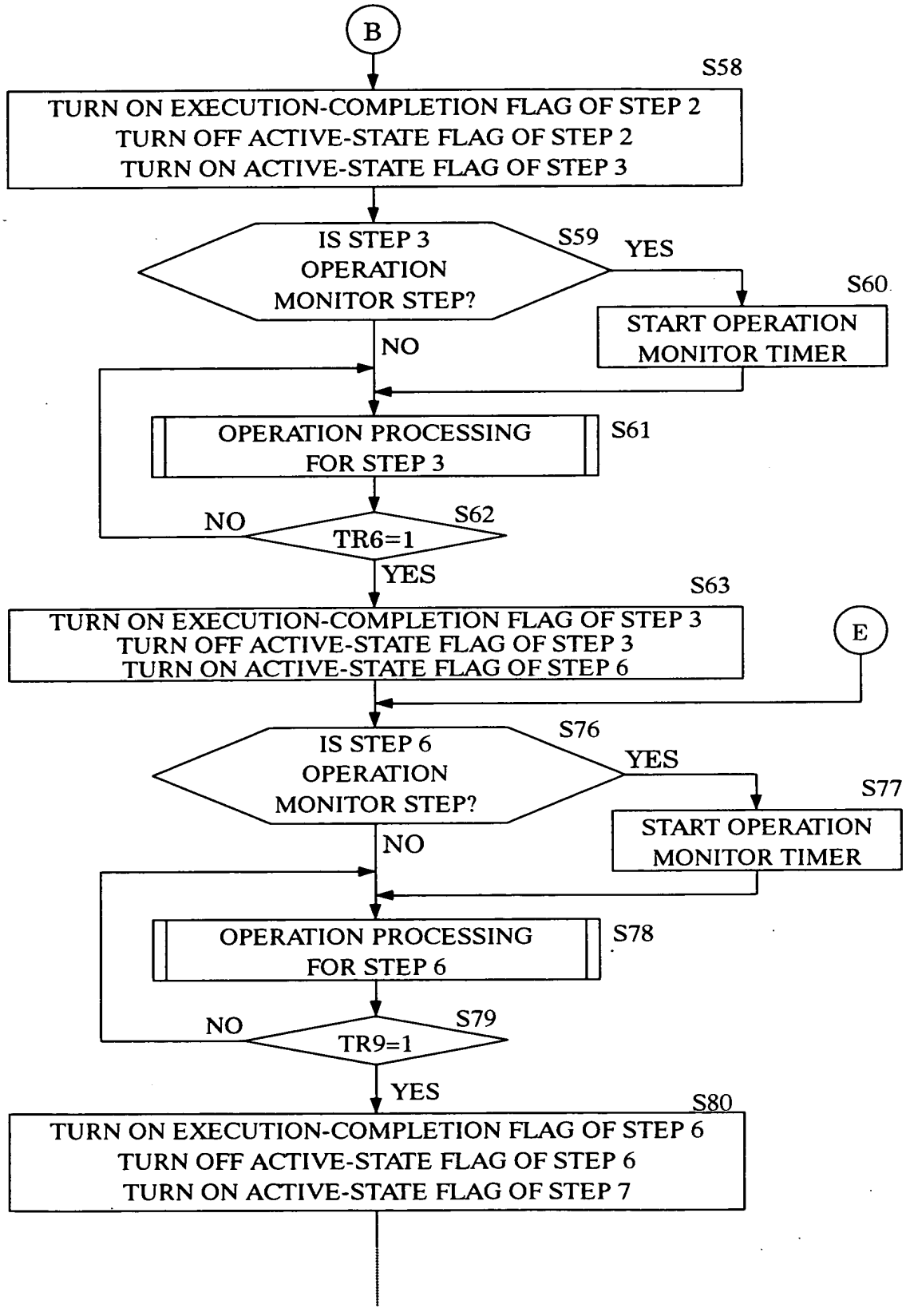

B
S58
TURN ON EXECUTION-COMPLETION FLAG OF STEP 2
TURN OFF ACTIVE-STATE FLAG OF STEP 2
TURN ON ACTIVE-STATE FLAG OF STEP 3
IS STEP 3 OPERATION MONITOR STEP?
S59
YES
S60
START OPERATION MONITOR TIMER
NO
OPERATION PROCESSING FOR STEP 3
S61
NO
TR6=1
S62
YES
S63
TURN ON EXECUTION-COMPLETION FLAG OF STEP 3
TURN OFF ACTIVE-STATE FLAG OF STEP 3
TURN ON ACTIVE-STATE FLAG OF STEP 6
E
IS STEP 6 OPERATION MONITOR STEP?
S76
YES
S77
START OPERATION MONITOR TIMER
NO
OPERATION PROCESSING FOR STEP 6
S78
NO
TR9=1
S79
YES
S80
TURN ON EXECUTION-COMPLETION FLAG OF STEP 6
TURN OFF ACTIVE-STATE FLAG OF STEP 6
TURN ON ACTIVE-STATE FLAG OF STEP 7

FIG. 13

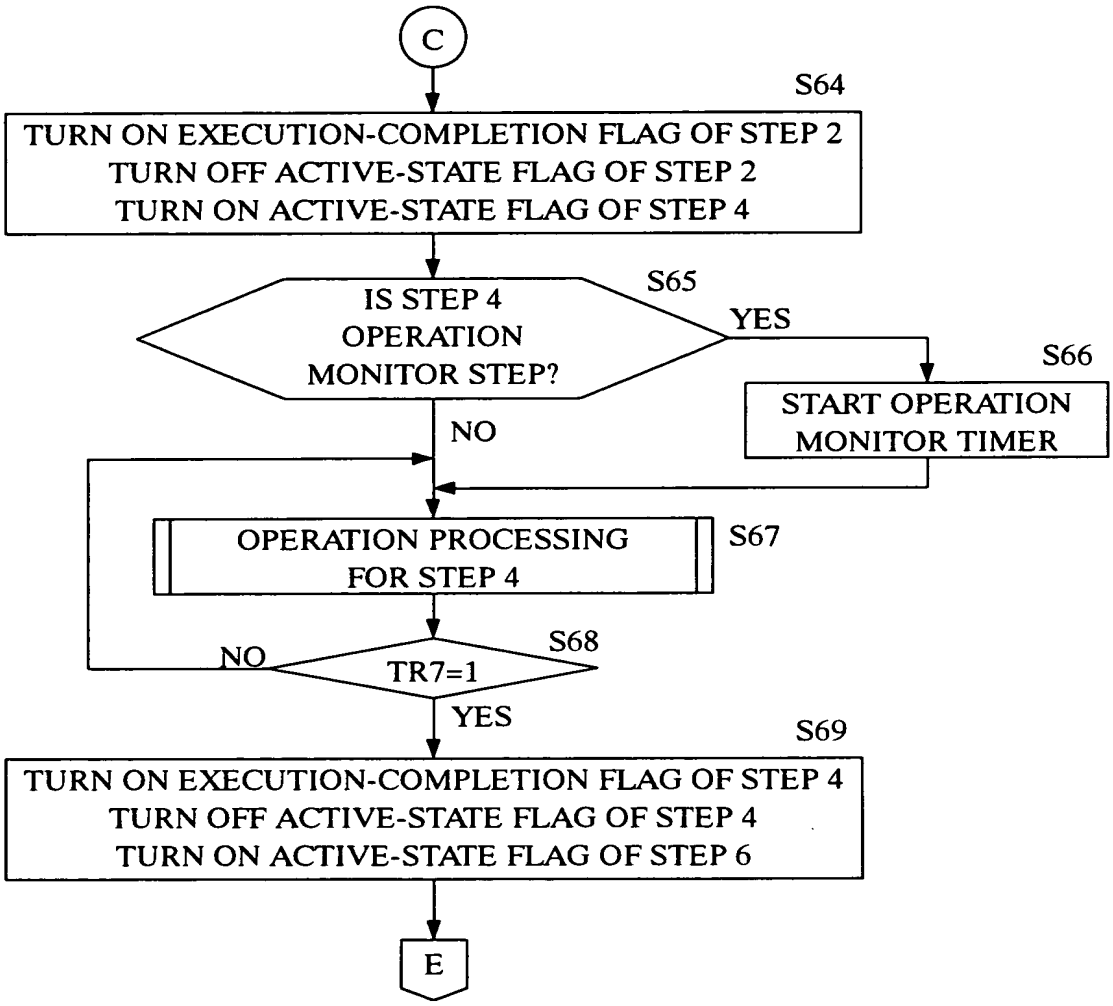

C
S64
TURN ON EXECUTION-COMPLETION FLAG OF STEP 2
TURN OFF ACTIVE-STATE FLAG OF STEP 2
TURN ON ACTIVE-STATE FLAG OF STEP 4
S65
IS STEP 4 OPERATION MONITOR STEP?
YES
S66
START OPERATION MONITOR TIMER
NO
OPERATION PROCESSING FOR STEP 4
S67
NO
S68
TR7=1
YES
S69
TURN ON EXECUTION-COMPLETION FLAG OF STEP 4
TURN OFF ACTIVE-STATE FLAG OF STEP 4
TURN ON ACTIVE-STATE FLAG OF STEP 6
E

FIG. 14

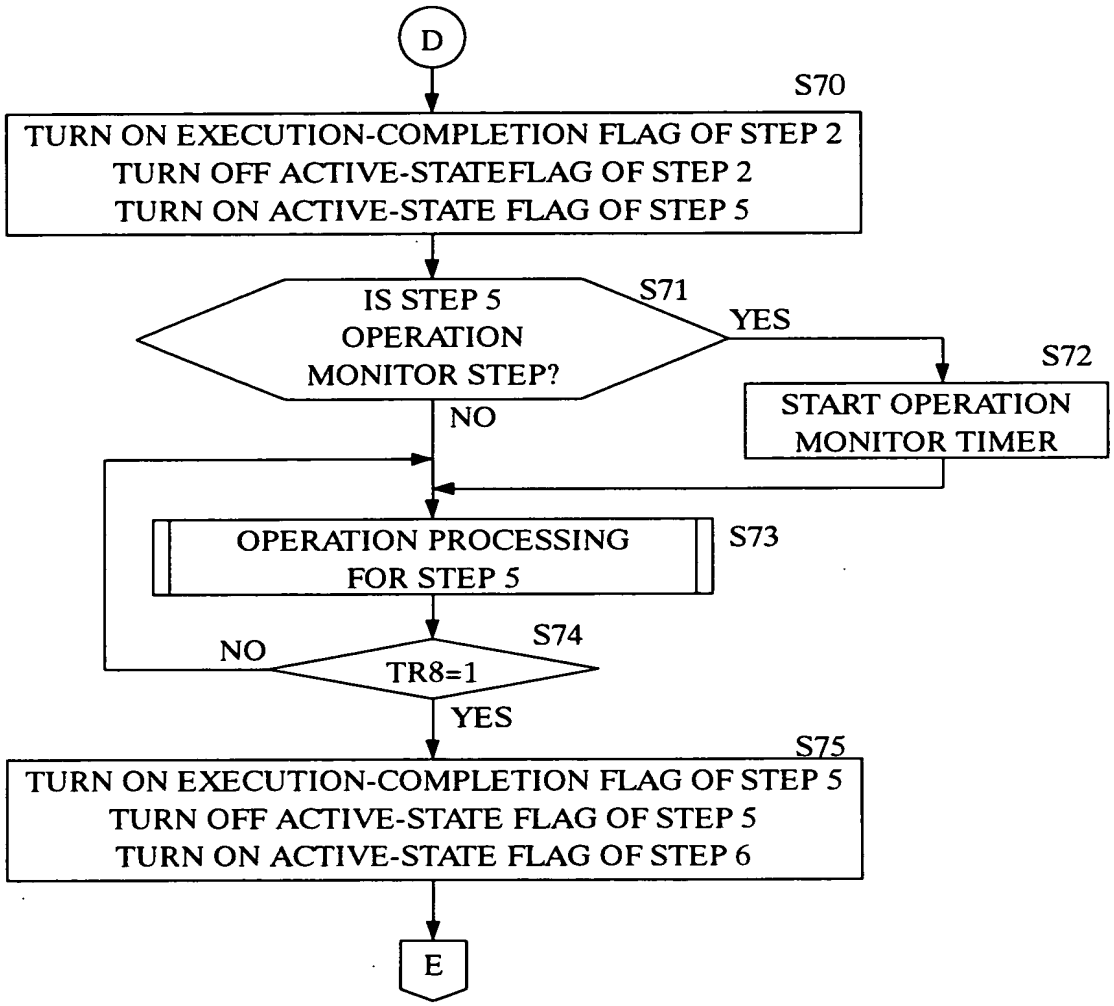

D
S70
TURN ON EXECUTION-COMPLETION FLAG OF STEP 2
TURN OFF ACTIVE-STATEFLAG OF STEP 2
TURN ON ACTIVE-STATE FLAG OF STEP 5
IS STEP 5 OPERATION MONITOR STEP?
S71
YES
S72
START OPERATION MONITOR TIMER
NO
OPERATION PROCESSING FOR STEP 5
S73
NO
S74
TR8=1
YES
S75
TURN ON EXECUTION-COMPLETION FLAG OF STEP 5
TURN OFF ACTIVE-STATE FLAG OF STEP 5
TURN ON ACTIVE-STATE FLAG OF STEP 6
E

FIG. 15

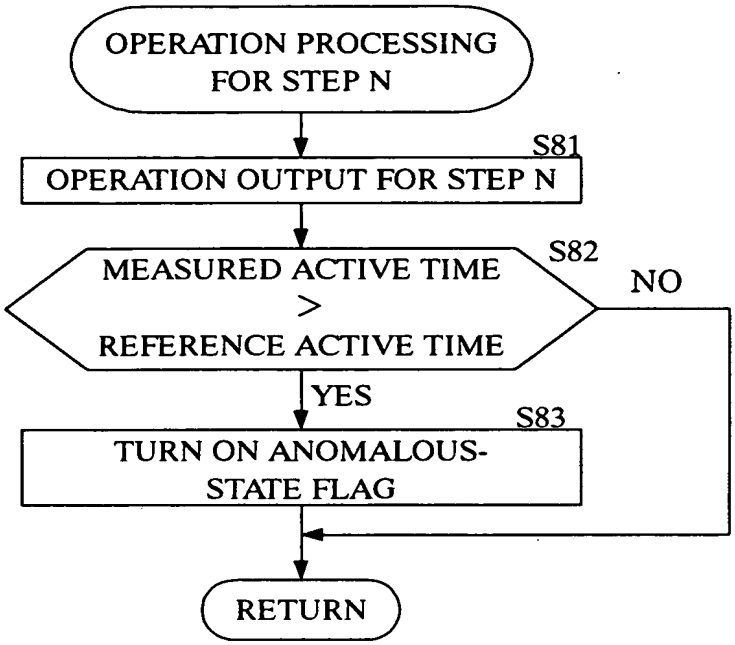

OPERATION PROCESSING FOR STEP N
S81
OPERATION OUTPUT FOR STEP N
S82
MEASURED ACTIVE TIME
>
REFERENCE ACTIVE TIME
NO
YES
S83
TURN ON ANOMALOUS-STATE FLAG
RETURN

FIG. 16

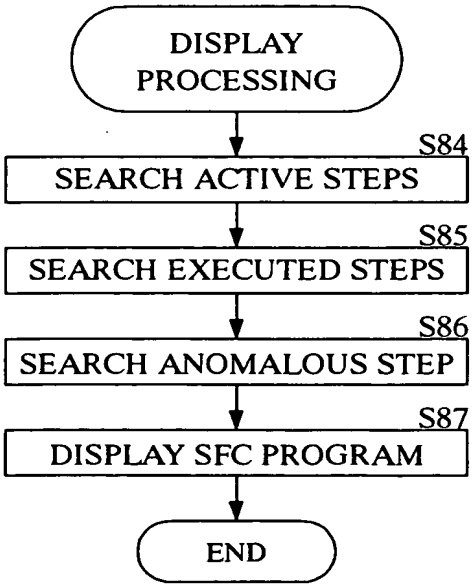
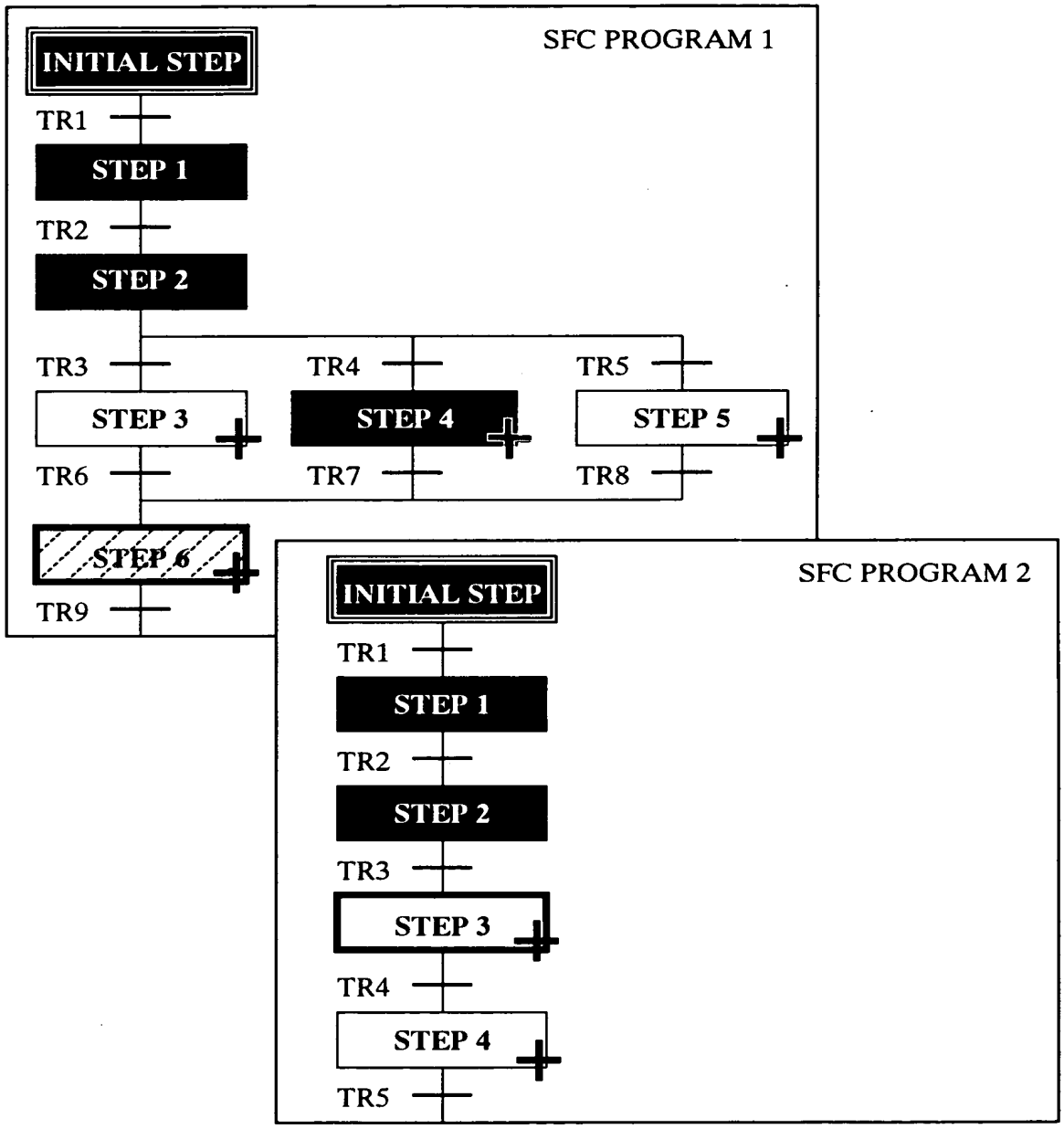

DISPLAY PROCESSING
S84
SEARCH ACTIVE STEPS
S85
SEARCH EXECUTED STEPS
S86
SEARCH ANOMALOUS STEP
S87
DISPLAY SFC PROGRAM
END

FIG. 17

STEP	ACTIVE FLAG	EXECUTION-COMPLETION FLAG	ANOMALOUS-STATE FLAG
INITIAL STEP	0	1	0
STEP 1	0	1	0
STEP 2	0	1	0
STEP 3	0	0	0
STEP 4	0	1	0
STEP 5	0	0	0
STEP 6	1	0	1
. . .			

FIG. 18


SFC PROGRAM 1
INITIAL STEP
TR1
STEP 1
TR2
STEP 2
TR3
TR4
TR5
STEP 3
STEP 4
STEP 5
TR6
TR7
TR8
STEP 6
TR9
SFC PROGRAM 2
INITIAL STEP
TR1
STEP 1
TR2
STEP 2
TR3
STEP 3
TR4
STEP 4
TR5